CLAIMS

1. Apparatus for imaging the internal structure of a volume exhibiting an internal variation, comprising:

    a source of penetrating radiation and a two dimensional detector for that radiation, the source and the detector being arranged to produce a series of projected images of the volume;

    a reconstruction means for deriving information as to the three dimensional structure in the volume from selected images of the series;

    a selection means for selecting images with similar phase from the series for use by the reconstruction means;

    wherein the selection means is arranged to:

    collapse the images derived from the series from two dimensions to one dimension by summing the intensities of pixels along a dimension transverse to the one dimension,

    produce a further image from a composite of the one-dimensional images obtained from images in the series,

    analyse the further image for patterns, and

    select from the series images having like phase in that pattern.

2. Apparatus according to claim 1 in which the source and detector are rotateable relative to the volume, such that the series of projected images show the volume in different orientations.

3. Apparatus according to claim 1 in which the variation is periodic.

4. Apparatus according to claim 1 in which the images are pre-processed prior to operation of the selection means.

5. Apparatus according to claim 4 in which the pre-processing includes filters for narrowing the range of intensities in the image.

6. Apparatus according to claim 4 in which the pre-processing includes derivative filters to highlight edges in the image.

7. Apparatus according to claim 6 in which the volume contains a patient and the derivative is carried out in the direction of the craniocordal axis of the patient.

8. Apparatus according claim 4 in which the pre-processing includes a mask applied to the image to select areas including edges.

9. Apparatus according to claim 8 in which the edge mask is derived from a threshold applied to the image as filtered via a derivative filter.

10. Apparatus according to claim 4 in which the pre-processing includes the application of a mask to exclude areas of the image that are external to an object within the volume.

11. Apparatus according to claim 1 in which a plurality of reconstructions are derived from a plurality of subsets each containing phase-correlated images from the series, the phase correlation of each subset differing from the phase correlation of other subsets.

12. Apparatus according to claim 1 in which the analysis for periodic patterns in the further image includes a step of comparison of the one-dimensional images therein to identify a movement of features in that dimension.

13. Apparatus according to claim 12 in which adjacent images are compared.

14. Apparatus according to claim 12 in which the one-dimensional images are compared by calculating the difference in intensity between the images at different relative shifts of the images.

15. Apparatus according to claim 14 in which the rms difference is compared.

16. Apparatus according to claim 1 in which the further image is subjected to processing prior to analysis for periodic patterns.

17. Apparatus according to claim 16 in which the pre-processing includes derivative filters to highlight edges in the further image.

18. Apparatus according to claim 17 in which the derivative is carried out in a direction transverse to the one dimension.

19. Apparatus according to claim 16 in which the pre-processing includes the selection of a region of interest in the further image and the exclusion of other areas from further processing.

20. Apparatus according to claim 19 in which the region of interest is selected by analysis of the area containing the highest derivatives.

21. Apparatus according to claim 1 in which the variation is a natural variation exhibited by living organism.

22. Apparatus according to claim 21 in which the variation is caused by breathing.

23. A method of selecting phase correlated images from the output of a scanner, comprising the steps of, for each of a plurality of images in a series thereof produced by the scanner:

   collapsing the images from two dimensions to one dimension by summing the intensities of pixels along a dimension transverse to the one dimension,

   producing a further image from a composite of the one-dimensional images obtained from images in the series,

   analysing the further image for periodic patterns, and

   selecting from the series images having like phase in that periodic pattern.

24. A method according to claim 23 in which the scanner is a cone beam CT scanner.

25. A method according to claim 24 in which the images are of a breathing patient.

26. A software module for selecting phase correlated images from the output of a scanner, arranged to execute the steps of, for each of a plurality of images in a series thereof produced by the scanner:

    collapsing the images from two dimensions to one dimension by summing the intensities of pixels along a dimension transverse to the one dimension,

    producing a further image from a composite of the one-dimensional images obtained from images in the series,

    analysing the further image for periodic patterns, and

    selecting from the series images having like phase in that periodic pattern.

27. A method according to claim 26 in which the scanner is a cone beam CT scanner.

28. A method according to claim 27 in which the images are of a breathing patient.